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| 10/613,992      | 07/08/2003  | Masahiko Kubota      | 03500.017378.       | 6238             |

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EXAMINER

GORDON, RAQUEL YVETTE

ART UNIT PAPER NUMBER

2853

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/613,992

Applicant(s)

KUBOTA ET AL.

Examiner

Raquel Y. Gordon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on July 8, 2003 (this application).
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-14 and 16 is/are rejected.
- 7) ☒ Claim(s) 2-3,6-10,15 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/8/2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation of "as a bottom surface thereof," (claim 1) makes it unclear as to exactly which feature has a bottom surface.

Further, the claimed arrangement is unclear making it unclear as to exactly what is being claimed: "a central axis of a lower surface of said second bubbling chamber coincides with a center axial of an upper surface of said second bubbling chamber in a direction perpendicular to said substrate, a sectional area of the upper surface with respect to the central axis of said second bubbling chamber is smaller than a sectional area of the lower surface with respect to the central axis of said second bubbling chamber, the sectional area in the central axial direction is changed continuously from the lower surface to the upper surface of said second bubbling chamber, and the sectional area of the upper surface with respect to the center axis of said second bubbling chamber is greater than a sectional area with respect to a central axis of said discharge port portion." (claim 1);

Further, a sectional area thereof in the central axis direction (claim 2) , as recited, makes it unclear as to exactly which feature has a central axis.

Further, the term "the vicinity" (claim 6) lacks antecedent basis.

Further, with respect to claim 11, the term "in which said nozzles are arranged so that longitudinal directions of said nozzles becomes in parallel and a second nozzle array which is disposed at a position opposed to said first nozzle array with the interposition of said supply chamber and in which the longitudinal directions of said nozzles becomes in parallel, and longitudinal central axes of said nozzles in said second nozzle array are disposed with respect to longitudinal central axes of said nozzles in said first nozzle array by 1/2 of a pitch between the adjacent nozzles" is unclear since it is unclear what features permits the nozzle array to "become" into parallel.

The recitation of the "longitudinal axes," as claimed, continue to make it unclear as to exactly what is being claimed.

Further, the recitation of "a maximum height of said supply path from the surface of said element substrate is smaller than a height from the surface of said element substrate to the upper surface of said second bubbling chamber" (instant claim 5) makes it unclear as to exactly what is being claimed since it is unclear as to how the maximum height of said supply path is being measured (e.g. from the surface of said element substrate *to where* is unclear with respect to the distance being claimed).

Claims 3, 4, and 7-10 are rejected as they depend from rejected base claims.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11

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F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**Claims 1, 5, and 11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of copending Application No. 10/191576 in view of Katner (US 4209794). Co-pending Application No. 10/191576 teaches:**

1. A liquid discharge head comprising: a discharge energy generating element for generating energy for discharging a liquid droplet (claim 1, lines 1-2); an element substrate having a main surface (claim 1, lines 3-4) on which said discharge energy generating element (claim 1, lines 5-12) is provided; a discharge port portion ("ejection port" claim 1, line 7) having a discharge port for discharging the liquid droplet; a nozzle having a bubbling chamber (claim 1, lines 5-12) in which a bubble is generated in liquid by said discharge energy generating element (claim 1, lines 5-12) and a supply path (claim 1, lines 10-12) for supplying the liquid to said bubbling chamber (claim 1, lines 10-12); a supply chamber for supplying the liquid to said nozzle; and an orifice substrate joined to the main surface (claim 1, lines 13-19) of said element substrate; wherein said bubbling chamber includes a first bubbling chamber (claim 1, lines 5-12) which is

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communicated with said supply path and uses the main surface of said element substrate and in which the bubble is generated in the liquid by said discharge energy generating element;

11. A liquid discharge head according to claim 1, wherein said orifice substrate is provided with plural nozzles corresponding to the respective discharge energy generating elements and said plural nozzles are divided into a first nozzle array (claim 1, lines 5-8).

**Co-pending Application No. 10/191576 does not explicitly teach the differences of:**

“a second bubbling chamber communicated with said first bubbling chamber said second bubbling chamber is communicated with said discharge port portion,” as recited in instant claim 1; and

5. A liquid discharge head according to claim 1, wherein an upper surface of said supply path parallel with the main surface of said element substrate near said supply chamber is higher than an upper surface of said supply path contiguous to and flush-with an upper surface of said first bubbling chamber and is connected to the latter upper surface via a stepped portion, and a maximum height of said supply path from the surface of said element substrate is smaller than a height from the surface of said element substrate to the upper surface of said second bubbling chamber;

**Nevertheless, Kattner seen to sufficiently teach:**

This is a provisional obviousness-type double patenting rejection.

“a second bubbling chamber (6) communicated with said first bubbling chamber (5), said second bubbling chamber is communicated with said discharge port portion (1),” as recited in instant claim 1 (see fig. 1); and

5. A liquid discharge head according to claim 1, wherein an upper surface (surface between elements 5 and 6 in figure 1) of said supply path parallel with the main surface of said element substrate near said supply chamber is higher than an upper surface of said supply path contiguous to and flush-with an upper surface of said first bubbling chamber (11) and is connected to the latter upper surface via a stepped portion (bottom surface of element 6 in figure 1), and a maximum height of said supply path from the surface of said element substrate is smaller than a height from the surface of said element substrate to the upper surface of said second bubbling chamber (see height of element 5 which is smaller than the height of element 3 which includes the heights of elements 5 and 6 in figure 1).

It would have obvious to one of ordinary skill in the art at the time the invention was made to modify Co-pending Application No. 10/191576 by the aforementioned teachings of Kattner, for the purpose of optimally aligning expelled ink droplets, as taught by Kattner.

**Claims 12-14 and 16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of copending Application No. 10/615143. The reference teaches:**

12. A method for manufacturing a liquid discharge head comprising a discharge energy generating element (claim 5, ln 3) for generating energy for discharging a liquid droplet (claim 5, ln 4), an element substrate having a main surface (claim 5, ln 6) on which said discharge energy generating element is provided, a discharge port portion having a discharge port for discharging the liquid droplet (claim 5, lns 7-9), a nozzle (claim 5, ln 11) having a bubbling chamber in which a bubble is generated in liquid by said discharge energy generating element and a supply path (claim 12, ln 13) for supplying the liquid to said bubbling chamber (claim 5, ln 2), a supply chamber for supplying the liquid to said nozzle and an orifice substrate (claim 5, ln 7) joined to the main surface of said element substrate, the method comprising the steps of: coating thermal bridge type organic resin soluble by solvent and adapted to form a pattern for said first bubbling chamber and a lower portion of said supply path on said element substrate having the main surface on which said discharge energy generating element is provided and heating the resin to form a thermal bridge film (claim 5, lns 26-22); coating organic resin soluble by solvent and adapted to form a pattern for said second bubbling chamber and an upper portion of said supply path on said thermal bridge film (claim 5, lns 23-26); exposing and developing the organic resin by using Near-UV light having a wavelength of 260 to 330 nm in order to form the pattern for said second bubbling chamber and the



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upper portion of said supply path (claim 5, Ins 27-32, and claim 5, Ins 37-39); forming inclination of 10 to 45 degrees by heating the exposed, developed and pattern-formed organic resin at a temperature smaller than a glass transition point (claim 5, Ins 33-36); exposing and developing said thermal bridge film by using Deep-UV light having a wavelength of 210 to 330 nm (claim 5, Ins 37-39); laminating said orifice substrate having a discharge port by coating, exposing, developing and heating negative type organic resin on a flow path pattern formed by the two-layer soluble films (claim 5, Ins 40-44); and forming said discharge port portion for discharging the liquid droplet, said nozzle having said bubbling chamber in which the bubble is generated in liquid by said discharge energy generating element and said supply path for supplying the liquid to said bubbling chamber, said supply chamber for supplying the liquid to said nozzle and said orifice substrate joined to the main surface of said element substrate, by illuminating Deep-UV light onto said two-layer flow path forming organic resins formed on said lower layer via said orifice substrate thereby to remove the resins by solvent (claim 5, Ins 45-56);

13. A method according to claim 12, wherein, said second bubbling chamber and the upper portion of said supply path are formed by pattern transferring, by using a photo-mask in which a pattern of said second bubbling chamber is a normal resolving power pattern of the organic resin and a pattern of the upper portion of said supply path is a pattern smaller than limited resolving power of the organic resin and by using Near-UV light having a wavelength of 260 to 330 nm (claim 5, Ins 37-39);

14. A method according to claim 12, wherein the formation of said second bubbling chamber and the upper portion of said supply path is divided into an area where the resin is removed completely, an area where the resin is removed partially and an area where the resin is not removed at all in said exposing and developing step of the organic resin (claim 5, Ins 45-56);

16. A method according to claim 12, wherein a height of said first bubbling chamber on said element substrate is 5 to 20  $\mu\text{m}$  and is formed with inclination of 0 to 10 degrees with respect to a plane perpendicular to the main surface of said element substrate (claim 6/5).

However, although the conflicting claims are not identical, they are not patentably distinct from each other. The difference the claimed combination uses slightly different language in reciting the claims as compared to the language of Kubata (10/615143). It would have been obvious to one of ordinary skill in the art at the time the invention was made the method of the instant claims and the method of Kubata teach the same result and benefit including providing improved discharge efficiency, as taught by Kubata.

This is a provisional obviousness-type double patenting rejection.

***Allowable Subject Matter***

Claim 6 is would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 2-3, 7-10, 15, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for Indicating Allowable Subject Matter***

The following is a statement of reasons for the indication of allowable subject matter. For example, the following claim combinations are not found in the prior art::

2. A liquid discharge head according to claim 1, wherein, regarding a side wall surface of said second bubbling chamber, is changed continuously from the lower surface to the upper surface of said second bubbling chamber with inclination of 10 to 45 degrees with respect to a plane perpendicular to the main surface of said element substrate;

3. A liquid discharge head according to claim 1, wherein said first bubbling chamber is enclosed, in three directions, by nozzle walls for partitioning said plural nozzles arranged in parallel to individual nozzles and, a wall surface of said discharge port portion is parallel with the plane perpendicular to the main surface of said element substrate.

4. A liquid discharge head according to claim 1, wherein said first bubbling chamber is enclosed, in three directions, by nozzle walls for partitioning said plural nozzles arranged in parallel to individual nozzles and, a wall surface of said discharge port portion has taper smaller than 10.degree. with respect to the plane perpendicular to the main surface of said element substrate;

6. A liquid discharge head according to claim 1, wherein a width of said supply path on a plane perpendicular to a flowing direction of the liquid is changed along a thickness direction of said orifice substrate in the vicinity of said stepped portion;

7. A liquid discharge head according to claim 1, wherein said nozzle is designed so that a sectional area of the flow path extending from said discharge port to said supply chamber is changed with plural stages;

8. A liquid discharge head according to claim 1, wherein said nozzle is formed so that a discharging direction along which the liquid droplet is flying from said discharge port becomes perpendicular to a flowing direction of the liquid flowing in said supply path;

9. A liquid discharge head according to claim 1, wherein said nozzle is formed so that the sum of volumes of said first bubbling chamber, said second bubbling chamber and said discharge port portion becomes smaller than a volume of said supply path;

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10. A liquid discharge head according to claim 1, wherein the bubble generated by said discharge energy generating element is communicated with atmosphere during the discharging;

15. A method according to claim 14, wherein, in said exposing and developing step of the organic resin, said area where the resin is not removed at all forms said second bubbling chamber and said area where the resin is removed partially forms the upper portion of said supply path;

17. A method according to claim 12, wherein the thermal bridge type organic resin for forming said first bubbling chamber and said supply path mainly includes methyl methacrylate and is formed by dissolving material obtained by being copolymerized with methacrylic acid and methacrylic acid ester into coating solvent.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Raquel Y. Gordon, whose telephone number is (571) 272-2145. The Examiner can normally be reached on M Tu Th and F 8:30-6:00.

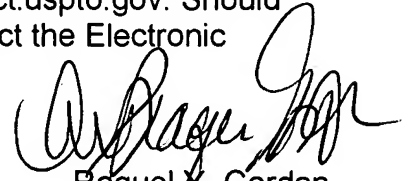
If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. A fax number is available upon request.

Any inquiry of a general nature or relating to the status of this application or proceeding may be directed to the Examiner or Supervisor.

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The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Raquel X. Gordon  
Primary Examiner  
Art Unit 2853  
December 11, 2004

**RAQUEL GORDON**  
**PRIMARY EXAMINER**